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Beck, T.H.L.; Demirgüc-Kunt, A.; Martinez Peria, M.

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Bank Financing for SMEs: Evidence Across Countries and Bank Ownership Types

Thorsten Beck · Asli Demirgüç-Kunt · María Soledad Martínez Pería

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Abstract Using data for 91 large banks from 45 countries, this paper finds that foreign, domestic private, and government-owned banks use different lending technologies and organizational structures for SME financing. The extent, type, and pricing of SME loans, however, is not strongly correlated with lending technologies and organizational structures, suggesting that SME financing need not be based only on "relationship lending". Consistent with these results, we find few significant differences in the extent, type, and pricing of SME loans across bank types. Instead, we find significant differences across developed and developing countries, driven by differences in the institutional and legal environment.

Keywords Bank financing · Small and medium-sized enterprises · Small and medium-size enterprises · Business environment · Financing constraints · Lending techniques

JEL G21 · G30

1 Introduction

The financing of small and medium-sized enterprises (SMEs) has been a subject of great interest both to policymakers and researchers because of the significance of SMEs in private sectors around the world and the perception that these firms are financially constrained. Data collected by Ayyagari et al. (2007) for 76 developed and developing countries indicate that, on average, SMEs account for close to 60% of manufacturing employment. More importantly, a number of studies using firm-level survey data have

T. Beck (✉)
CentER, Department of Economics, Tilburg University, P.O.Box 90153,
5000 LE Tilburg, Netherlands
e-mail: T.Beck@uvt.nl.Address

A. Demirgüç-Kunt · M. S. M. Pería
World Bank, Washington, DC, USA

shown that SMEs not only perceive access to finance and the cost of credit to be greater obstacles than large firms, but these factors constrain SMEs (i.e., affect their performance) more than large firms (Schiffer and Weder 2001; IADB 2004; Beck et al. 2005, 2006).

In recent years a debate has emerged regarding the nature of bank financing for SMEs. Until recently, the conventional wisdom regarding SME finance was that small and domestic private banks are more likely to finance SMEs because they are better suited to engage in "relationship lending", a type of financing based primarily on "soft" information gathered by the loan officer through continuous, personalized, direct contacts with SMEs, their owners and managers, and the local community in which they operate (see Berger et al. 1995, 2001; Keeton 1995; Berger and Udell 1996; and Strahan and Weston 1996; Mian 2006; and Sengupta 2007). Also, studies such as Stein (2002), Mian (2006), Canales and Nanda (2008), and Liberti and Mian (2009) have argued that more centralized and hierarchical organizational structures can have a negative impact on lending to opaque borrowers, such as SMEs. However, some recent studies (see Berger and Udell 2006; Berger et al. 2007; and de la Torre et al. 2010) have begun to dispute this conventional wisdom and propose a new paradigm for bank SME finance, arguing that large and foreign banks can be as effective in SME lending through arms-length lending technologies (e.g., asset-based lending, factoring, leasing, fixed-asset lending, credit scoring, etc.) and centralized organizational structures instead of relationship lending.

This paper tries to inform this recent debate using newly gathered data for 91 large banks from 45 countries. Specifically, to our knowledge, this is the first study to rigorously test a number of hypotheses that emerge from the literature proposing a new paradigm for SME finance.[1] First, we examine whether different bank ownership types use different lending technologies and organizational structures in lending to SMEs. In particular, we examine whether foreign banks are more likely than domestic private banks to use arms-length lending technologies based on hard information and centralized organizational structures. Second, we investigate whether arms-length lending technologies and centralized organizations structures are just as suitable for SME lending as relationship lending. Third, we test whether, although foreign banks make greater use of arms-length lending technologies and centralized organizational structures, they do not tend to specialize less heavily in SME finance or make SME loans on less favorable terms than domestic private banks. Finally, we analyze whether the institutional and legal environment of the country affects the extent, type, and pricing of SME loans.

Our paper focuses on banks as opposed to other financial institutions because studies have shown that banks are the main source of external finance for SMEs across countries (see Beck et al. 2008a). Furthermore, we concentrate on large banks due to their systemic importance and their significance as potential SME financiers.[2] However, there are undoubtedly some selection biases that might arise from restricting our sample to large banks. First, we might be leaving out some domestic niche banks (for example cooperative banks) that are especially focused on SME lending. Second, to the extent that large banks around the world are more likely to be similar to each other in terms of lending technologies and organizational structures, and given that most foreign banks in developing countries tend to be large,

[1] A number of papers by staff at the World Bank have looked at the SME lending practices of banks in developing countries, but the analysis in those papers is purely descriptive (see World Bank 2007a; b; De la Torre et al. 2010; Stephanou and Rodriguez 2008).

[2] Large banks are also the ones with the most extensive branch networks and, hence, the ones most accessible to SMEs, at least in terms of location.

focusing only on large banks might downplay potential differences in lending technologies and organizational structures across bank ownership types.

Our results offer empirical support for the hypotheses posed by the recent literature advocating a new paradigm in SME finance. We find that banks of different ownership types apply different lending technologies and organizational structures in lending to SMEs. In particular, foreign banks grant a higher share of collateralized loans, are less likely to rate soft information as important in evaluating loans, and are also less likely to decentralize loan approval and risk management decisions. However, we find few significant correlations between lending technologies and organizational structures, on the one hand, and the extent, type and pricing of SME lending, on the other hand. Consistent with these findings, we find few differences in the extent, type, and pricing of SME loans across foreign and domestic private banks. Instead, we find significant differences across banks in developed and developing countries that appear to be driven by differences in the institutional and legal environment. In particular, banks in developing countries provide a lower share of investment loans and charge higher fees to SMEs than those in developed countries. Finally, banks in developing countries also tend to charge higher interest rates on small firm loans.

The rest of the paper is organized as follows. Section 2 describes the survey used to gather our data. Section 3 investigates differences in lending technologies and organizational structures across bank ownership types. Section 4 examines the correlation between lending technologies and organizational structures, on the one hand, and the extent, type, and pricing of bank financing to SMEs, on the other hand. Section 5 explores differences in the extent, type, and pricing of bank financing to SMEs across banks of different ownership. In particular, this section tests whether foreign banks tend to specialize less heavily in SME finance or make SME loans on less favorable terms than domestic private banks. Also, this section examines differences in SME lending across countries and tries to relate these differences to measures of the institutional and legal environment. Finally, Section 6 concludes.

2 The survey

To gather information on bank financing to SMEs around the world, we designed a survey with 56 questions with the aim of (1) documenting banks' perceptions regarding the SME segment, (2) understanding banks' business models (in particular, lending technologies and organizational structures) used to serve SMEs, and (3) quantifying the extent, type, and pricing of bank financing to SMEs.[3]

Using data from Bankscope, we identified the five largest commercial banks in terms of assets in close to 80 countries around the world and invited them to respond to our survey throughout 2007. Table 1 lists the countries that responded to our survey, shows the number of banks that participated from each country, along with the banks' combined market share. In total, we obtained responses from 91 banks in 45 countries. On average, the banks that responded account for 32% of banking system loans in each country. The loan market share exceeds 30% for 24 countries. For 25 countries, we were able to get a response from the largest bank in the system. We obtained multiple bank responses for 30 countries: for 4

[3] The working paper version of this paper (see Beck et al. 2008b) provides more information regarding banks' perceptions of the SME segment, discusses the perceived drivers and obstacles to SME finance, and examines banks' views of government programs to support SME finance.

countries we got 4 banks to respond in each country, for 8 countries we received responses from 3 banks, and for 18 countries we obtained 2 bank responses. Only one bank responded in 15 countries.

Among the 45 countries in our sample, 38 are developing and the remaining 7 are developed. Our dataset covers 14 countries in Eastern Europe and Central Asia, 9 in Latin America and the Caribbean, 8 in Sub-Saharan Africa, 4 in South Asia, 2 in the Middle East and North Africa and 1 in East Asia. All 7 developed countries are in Western Europe.

As summarized in Table 2, our survey includes 11 banks operating in developed countries and 80 banks operating in developing countries. In terms of bank ownership types, our sample includes 17 government-owned banks (one operating in a developed economy and the remaining 16 in developing countries), 32 domestic private banks (6 in developed countries and 26 in developing countries) and 42 foreign-owned banks (4 in developed countries and 38 in developing countries).

Rather than giving banks a predetermined size classification of firms, the survey asked banks to provide their own definition of small and medium-sized firms. In particular, banks were asked to provide a range in terms of sales, assets, or employees. Most banks (85%) define SMEs in terms of annual sales. In particular, on average, banks define small firms as those with annual sales between 200,000 and 4 million U.S. dollars and medium-sized firms as those with sales between 2 and 16 million dollars.[4] The average midpoint of the range for small firms is 2 million dollars and for medium-sized firms is 9 million dollars.

The definition of an SME is not very different across banks. Figures 1a and b plot the cumulative frequency of the midpoint for the range provided as definition for small and medium-sized firms, respectively. Close to 70% of banks define small and medium-sized firms as those with sales of less than 2.5 and 10 million dollars, respectively. Furthermore, the definition provided by banks is remarkably similar to the average annual sales reported by small and medium-sized firms in recent enterprise surveys conducted by The World Bank for the countries in our sample: 1.8 million dollars in the case of small firms (defined in the enterprise surveys as those with less than 20 employees) and 14.5 million dollars in the case of medium-sized firms (those with 20 to 99 employees). Since the enterprise survey samples are constructed to be representative of the universe of firms in each country, this suggests that banks are defining SMEs in a way that is consistent with the actual size distribution of firms. In other words, these statistics reduce the concern that banks' definition of SMEs refers to firms that are substantially larger than those operating in the countries in our sample.

3 Lending technologies and organizational structures across banks

Do banks of different ownership type adopt different lending technologies and organizational structures to lend to SMEs, once we control for country differences? In particular, is it the case that, as some studies suggest, foreign banks are more likely to apply arms-length lending technologies and centralized organization structures to SME lending (e.g., Berger et al. 2001; Mian 2006). In this first result section, we test for differences in lending technologies and organizational structures across domestic private, government-

[4] Banks were asked to provide a range for their definition of small and medium-sized firms. The averages mentioned here refer to the lower and upper limits of the range provided by each bank.

Table 1 Characteristics of survey respondents. Table shows the countries in our sample, the number of banks that responded from each country (including whether the largest bank has participated in the survey), and the market share of respondents relative to total loans

Country	No. of bank respondents	Has the largest bank responded?	Market share covered (% of (% of loans to total system loans)
Albania	3	Yes	59%
Armenia	3	Yes	35%
Austria	1		1%
Belarus	1	Yes	48%
Belgium	1		10%
Bosnia	2	Yes	38%
Brazil	1		9%
Bulgaria	2	Yes	32%
Chile	1		19%
Colombia	3	Yes	48%
Costa Rica	2	Yes	31%
Croatia	2		22%
Ecuador	1	Yes	38%
El Salvador	1		26%
Ethiopia	1		16%
Finland	1	Yes	38%
Georgia	3		47%
Greece	2	Yes	33%
Honduras	2		29%
Hungary	2	Yes	35%
India	4	Yes	41%
Indonesia	2		20%
Jordan	1		6%
Kenya	2	Yes	27%
Lebanon	3	Yes	37%
Lithuania	3		48%
Malawi	2	Yes	65%
Malta	3	Yes	71%
Mexico	2	Yes	23%
Moldova	2		35%
Nepal	1		8%
Pakistan	1	Yes	14%
Poland	1		8%
Sierra Leone	2		21%
Slovakia	2	Yes	40%
Slovenia	4	Yes	61%
South Africa	2	Yes	11%
Sri Lanka	4	Yes	69%
Swaziland	1		35%
Sweden	1		27%
Switzerland	2	Yes	40%

Table 1 (continued)

Country	No. of bank respondents	Has the largest bank responded?	Market share covered (% of (% of loans to total system loans)
Turkey	3	Yes	24%
Uruguay	2	Yes	46%
Zambia	2		28%
Zimbabwe	4		25%

owned, and foreign-owned banks. When it comes to government-owned banks, to our knowledge, the existing literature offers no evidence or predictions as to the lending technologies or organizational structures used by these banks to lend to SMEs.[5] Nonetheless, we feel it is interesting to use our data to explore whether any patterns exist.

In order to test for differences in lending technologies and organizational structures across banks types, we estimate Eq. 1:

$$Z_i = \alpha_0 + \alpha_1 Foreign_i + \alpha_2 Domestic\ Private_{i+}\alpha_3 Dev_i + e_i \quad (1)$$

where i refers to the bank and Z captures aspects of the lending technologies and the organizational structures used in SME lending. In particular, we consider five separate dimensions: *Use of scoring* is a variable that takes the value of 1 if scoring is used by the bank in making lending decisions and 0 otherwise. *Importance of soft information* is a dummy that equals 1 if the bank rates "soft" information (captured by firm owner characteristics) among the top two factors that the bank considers in making loan decisions and 0 otherwise.[6] *Share of SME loans secured* is the percentage of SME loans that is collateralized. *Decentralization of loan approval* is a variable that takes the value of 1 if lending decisions are made only or primarily at bank branches and 0 otherwise. Similarly, *Decentralization of risk management* is a variable that takes the value 1 if all risk management decisions are made only or primarily at bank branches and 0 otherwise. *Foreign* takes the value of 1 if the bank is foreign owned; *Domestic Private* is 1 if the bank is domestic privately-owned; *Dev* is 1 if the bank operates in a developing country. Because the use of scoring, the importance of soft information, and the extent of decentralization are binary response variables, we estimate those equations as probits. Finally, we use ordinary least squares to estimate the share of secured loans made out to SMEs. The results are shown in Table 3: Panel A shows the results for small firm lending, while Panel B presents the results for lending to medium-sized enterprises. At the bottom of each panel we report results testing for differences in the coefficients for foreign versus domestic private banks. Because government-owned banks are the omitted category, differences between this group of banks and foreign and domestic private banks, respectively, can be gleaned from the coefficients on *Foreign* and *Private*.

Table 3 shows that when it comes to lending both to small and medium-sized firms, foreign banks are less likely to rate soft information as important and to decentralize loan

[5] Mian (2003) notes that government-owned banks are likely to have less rigorous screening and monitoring mechanisms, as evidenced by their higher rates of non-performing loans.

[6] We get similar results if we make the criteria more stringent and define it so that soft information is listed as the top criteria. In fact, in that case, we find that we cannot estimate a coefficient for foreign banks or for developing countries since no foreign bank lists soft information as the top criteria and no bank in developed countries does that either.

Table 2 Number of banks in the sample by country and bank ownership type

Country\ownership type	Developed	Developing	Total
Foreign	4	38	42
Domestic private	6	26	32
Government	1	16	17
Total	11	80	91

approval and risk management processes than domestic private banks. Also, since the coefficients are significantly different, we see that the share of secured lending for foreign banks is higher than that for domestic private banks. Hence, we conclude that foreign banks are more likely to require collateral and attach lower importance to soft information in lending to small and medium-sized firms. On the other hand, we do not find any significant differences across bank types in terms of the use of scoring as a lending technology. Overall, these results confirm that foreign banks are more likely to use arms-length lending technologies and organizational structures in lending to SMEs.

Comparing government-owned to domestic private banks, we find that the former are less likely to rate soft information as important, more likely to decentralize loan approvals for small business lending, and more likely to require collateral when lending to medium-sized firms. Relative to foreign banks, government-owned banks are more likely to decentralize loan approval and risk management of both SME loans. Hence, in general, government-owned banks appear to be more likely to decentralize decisions involving SME finance, but do not appear to rely on relationship lending, since they seem more likely than private banks to use of collateral and hard information in lending to SMEs.

4 Linking SME finance with lending technologies and organizational structures

To what extent are differences in lending technologies and organizational structures associated with differences in the extent, type, and pricing of SME loans? While traditionally the literature has claimed that SME lending is largely based on soft information and decentralized organizational structures, studies proposing a new paradigm argue that different lending technologies and organizational structures can be applied to SME finance. In this section, we correlate the proxies for lending techniques and organizational structures, introduced above, with measures of the extent, type, and pricing of SME loans. Given that both aspects of bank business are likely to be determined simultaneously, we refrain from formal regression analysis in this context.

As indicators for SME lending, we use the *share of lending to SMEs* (expressed as a ratio of total lending), the *percentage of SME loan applications approved* (i.e., number of applications approved out of total number of SME loan applications received), the *share of SME loans devoted to investment*, the *fees charged on SME loans* (as a percentage of the loan amount), and the *real interest rate charged on SME loans*, both for the best (lowest risk) and for the worst (highest risk) customers. We interpret a higher share of SME loans to total loans and a larger share of SME loan applications approved as indicators of greater interest from banks in lending to SMEs. Given the riskiness associated with making loans to SMEs, SME loans are typically shorter-term than corporate loans to large enterprises, so that we assume that a higher share of (long-term) investment loans indicates a higher level

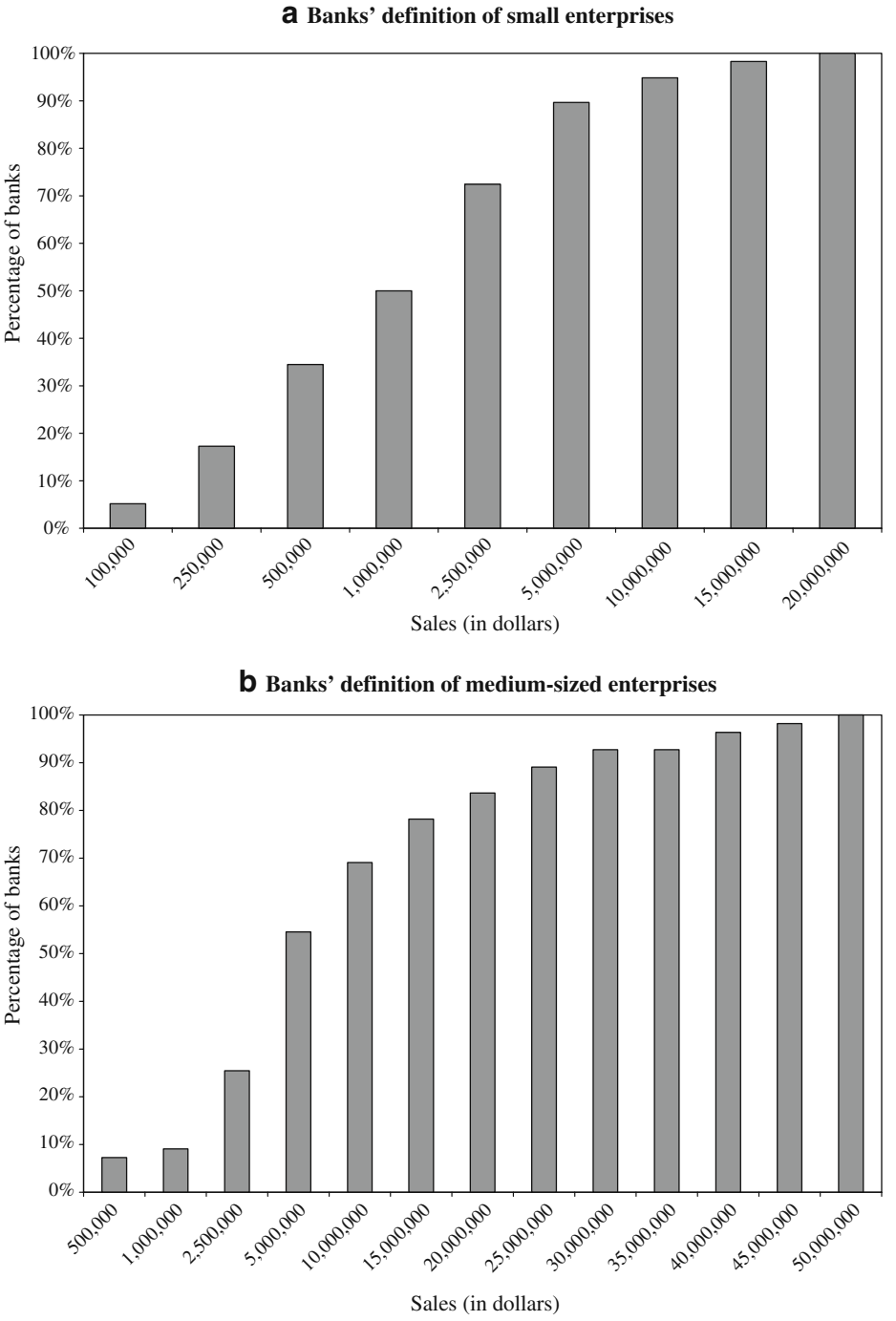

Fig. 1 **a** Banks' definition of small enterprises. (% of banks that define small enterprises as firms with sales less than amount on horizontal axis). **b** Banks' definition of medium-sized enterprises. (% of banks that define medium-sized enterprises as firms with sales less than amount on horizontal axis)

of comfort with lending to the SME segment. Finally, real interest rates and fees are two important indicators of the prices charged to SMEs.

Table 4 presents correlations between different variables capturing the extent, type and pricing of SME lending and variables proxying for lending technologies and organizational structures. Panel A reports correlations for the whole sample, while Panel B reports correlations for banks in developing countries only. The share of loans to SMEs, the share of SME loan applications approved, and the share of SME lending for investment purposes are not significantly correlated with the lending technologies or the organizational structures. We find that loan fees are higher for banks with a higher share of secured lending, but this seems to be driven by banks in developed countries, as the correlation turns insignificant in the sample of banks in developing countries. We also find that real interest rates for SME loans are lower in banks that are more likely to decentralize their loan approval and risk management processes. Finally, we find that the interest rates for the best SME clients are lower in banks that use scoring as part of the loan approval process.

Overall, as predicted by the studies proposing a new paradigm for SME lending, the organizational structures and lending technologies applied to SME finance show limited correlations with the extent, type, or pricing of SME lending. Furthermore, in particular, results do not seem to provide support for the notion that relationship lending is consistently associated with more and cheaper financing for SMEs.

5 The extent, type, and pricing of SME lending across countries and bank types

In this final result section, we examine how the extent, type, and pricing of SME lending varies by bank ownership type. On the one hand, some country case studies suggest that foreign banks are less likely to engage in SME lending because they tend to adopt arms-length lending technologies and have centralized and hierarchical organizational structures (e.g., see Mian 2006; Gormley 2010; Sengupta 2007). On the other hand, recent studies proposing a new paradigm for SME finance take a more nuanced view arguing that foreign banks can be as engaged in lending to SMEs, while at the same time acknowledging differences in lending technologies and organizational structures between foreign and domestic private banks (see Berger and Udell 2006 and de la Torre et al. 2010).[7]

When it comes to government-owned banks, the existing bank-level evidence suggests that, while government-owned banks tend to charge lower rates than domestic private banks, they are more likely to lend to large firms and to lend for political motives (see Sapienza 2004; Berger et al. 2008; Cole 2009). Furthermore, some studies have found that less SME credit is available in nations with large market shares of government-owned banks (e.g., Beck et al. 2004; Berger et al. 2004) and large shares of government bank ownership are typically associated with unfavorable macroeconomic consequences and less developed financial and economic systems (e.g., La Porta et al. 2002; Barth et al. 2004; Berger et al. 2004).

In this section, we also explore differences in the extent, type and pricing of SME finance across countries. The literature on private credit depth suggests that lending will be affected by the institutional and legal environment in the country (see Djankov et al. 2007). Furthermore, studies using firm-level data show that these factors disproportionally affect

[7] Firm-level evidence also shows that SME access to finance improves with greater foreign bank entry (see Clarke et al. 2006 and Giannetti and Ongena 2009).

Table 3 Lending technologies and organizational structures across bank ownership types. Table shows results from regressing variables proxying for the lending technologies and organizational structures used for SME financing on: a dummy for developing countries, a dummy for foreign banks, and a dummy for domestic private banks. Government-owned banks are the omitted category. Use of scoring takes the value of 1 if scoring is used by the bank in making lending decisions and 0 otherwise. Importance of soft information equals 1 if the bank rates "soft" information (captured by firm owner characteristics) among the top two factors that the bank considers in making SME financing decisions and 0 otherwise. Share of SME loans secured is the percentage of SME loans that is collateralized. Decentralization of loan approval takes the value of 1 if lending decisions are made only or primarily at bank branches and 0 otherwise. Decentralization of risk management takes the value 1 if all risk management decisions are made only or primarily at bank branches and 0 otherwise. Regressions for the use of scoring, importance of soft information, and the extent of decentralization are estimated as probits. We use ordinary least squares to estimate the share of secured loans made out to SMEs. Robust z/t statistics are in brackets

	Use of scoring	Importance of soft information	Share of loans secured (%)	Decentralization of loan approvals	Decentralization of risk management
Panel A: Small firm financing					
Developing	−0.501	0.635	22.650	0.009	−0.090
	[−1.06]	[1.09]	[1.89]^{a}	[0.02]	[−0.19]
Foreign bank	−0.003	−0.231	8.338	−1.596	−1.024
	[−0.01]	[−0.46]	[1.03]	[−3.02]^{c}	[−2.66]^{c}
Domestic private bank	0.126	0.788	−7.101	−1.075	−0.095
	[0.31]	[1.67]^{a}	[−0.82]	[−1.99]^{b}	[−0.24]
Constant	0.842	−1.761	56.600	1.556	0.627
	[1.45]	[−2.58]^{c}	[4.07]^{c}	[2.46]^{b}	[1.15]
Observations	85	83	69	88	86
R-squared / pseudo R-squared	0.01	0.11	0.12	0.11	0.10
Chi^2 or F-stat test: foreign = private	0.16	7.00	4.24	2.86	8.40
P-value	0.69	0.01	0.04	0.09	0.00
Panel B: Medium-sized firm financing					
Developing	−0.067	0.499	20.640	−0.181	−0.076
	[−0.16]	[0.85]	[1.98]^{a}	[−0.41]	[−0.14]
Foreign bank	−0.185	−0.210	−2.707	−1.097	−0.703
	[−0.49]	[−0.42]	[−0.48]	[−2.63]^{c}	[−1.78]^{a}
Domestic private bank	0.085	0.643	−17.070	−0.542	0.331
	[0.22]	[1.34]	[−2.52]^{b}	[−1.25]	[0.80]
Constant	0.136	−1.628	68.600	1.059	0.159
	[0.27]	[−2.39]^{b}	[6.04]^{c}	[1.95]^{a}	[0.26]
Observations	82	79	68	85	82
R-squared / pseudo R-squared	0.01	0.08	0.17	0.07	0.10
Chi^2 or F-stat test: foreign = private	0.73	4.64	4.05	3.18	9.76
P-value	0.39	0.03	0.05	0.07	0.00

[a,b,c] denotes significance at 10%, 5%, and 1% significance levels, respectively

Table 4 The link between SME finance and lending technologies and organizational structures. Table shows pairwise correlations between variables proxying for the extent, type, and pricing of SME financing (shown in the columns) and those capturing the lending technologies and organizational structures used in SME lending (shown in the rows). The share of lending to SMEs is expressed as a ratio of total lending. The percentage of SME loan applications approved is the number of applications approved out of the total number of SME loan applications received. The share of SME loans devoted to investment is the ratio of SME loans devoted to investment relative to the total value of SME loans granted. The fees charged on SME loans are expressed as a percentage of the loan amount. Importance of soft information equals 1 if the bank rates "soft" information (captured by firm owner characteristics) among the top two factors that the bank considers in making loan decisions and 0 otherwise. Share of SME loans secured is the percentage of SME loans that is collateralized. Decentralization of loan approval takes the value of 1 if lending decisions are made only or primarily at bank branches and 0 otherwise. Decentralization of risk management takes the value 1 if all risk management decisions are made only or primarily at bank branches and 0 otherwise. P-values are in parentheses

	Share of SME lending (%)	SME loan approval (%)	Share of SME loans for investment (%)	Fee (% of SME loan amount)	Real interest rate on lowest risk customers (%)	Real interest rate on highest risk customers (%)
Panel A: All countries						
Use of scoring	−0.05	0.14	0.07	−0.15	−0.12	−0.21
	(0.63)	(0.23)	(0.51)	(0.09)	(0.18)	(0.02)
Importance of soft information	−0.04	0.14	−0.04	0.06	−0.06	−0.09
	(0.66)	(0.17)	(0.67)	(0.42)	(0.44)	(0.22)
Share of SME loans secured (%)	−0.01	0.02	−0.08	0.16	0.01	−0.08
	(0.89)	(0.86)	(0.33)	(0.04)	(0.90)	(0.30)
Decentralization of loan approvals	0.05	0.10	0.10	−0.16	−0.42	−0.36
	(0.64)	(0.40)	(0.33)	(0.07)	(0.00)	(0.00)
Decentralization of risk management	−0.12	−0.07	0.04	0.05	−0.25	−0.16
	(0.25)	(0.55)	(0.69)	(0.57)	(0.01)	(0.08)
Panel B: Developing countries						
Use of scoring	−0.01	0.16	0.08	−0.15	−0.13	−0.23
	(0.94)	(0.21)	(0.47)	(0.11)	(0.20)	(0.02)
Importance of soft information	−0.05	0.15	0.02	0.03	−0.07	−0.11
	(0.56)	(0.15)	(0.80)	(0.73)	(0.36)	(0.17)
Share of SME loans secured (%)	−0.07	0.05	0.03	0.13	−0.02	−0.10
	(0.51)	(0.67)	(0.74)	(0.11)	(0.81)	(0.22)
Decentralization of loan approvals	0.06	0.19	0.03	−0.17	−0.43	−0.38
	(0.56)	(0.11)	(0.77)	(0.07)	(0.00)	(0.00)
Decentralization of risk management	−0.1	−0.01	−0.06	0.08	−0.24	−0.16
	(0.38)	(0.95)	(0.58)	(0.40)	(0.01)	(0.10)

SMEs' access to external financing and growth (see Beck et al. 2005, 2006, 2008a). Here, we use supply-side data to shed further light on this question.

To examine the differences in the extent, type and pricing of SME finance across banks and countries we estimate the following regression models:

$$Y_i = \beta_0 + \beta_1 Foreign_i + \beta_2 Private_i + \beta_3 Dev_i + e_i \quad (2)$$

$$Ysub_i = \delta_0 + \delta_1 Foreign_i + \delta_2 Private_i + \delta_3 Dev_i + \delta_{4i} X_i + e_i \quad (3)$$

where i refers to the bank. Y stands, alternatively, for the *share of lending to SMEs* (out of total lending), the *percentage of SME loan applications approved*, the *share of SME loans devoted to investment*, the *fees charged on SME loans* (as a percentage of the loan amount), and the *interest rate charged on SME loans*, both for the best and for the worst customers. *Ysub* refers to the subset of variables in Y for which we observe that *Dev*, the dummy for developing countries is significant. *Foreign* and *Private* are defined as before. X refers to different measures of the institutional and legal environment. While Eq. 2 is intended to examine differences in SME finance across bank ownership and country types, in Eq. 3 we try to examine what aspects of the institutional and legal environment explain the cross-country differences we identify in (2). We estimate a tobit regression model for the share SME loans devoted to investment and conduct ordinary least squares estimations for all other dependent variables.

The results from estimating Eq. 2 are shown in Table 5. Panel A shows results for small firm financing and Panel B shows results for medium-sized firm lending. The table indicates that controlling for country type (i.e., distinguishing between developed and developing countries), there are few significant differences in the extent, type, and pricing of SME lending across bank ownership types. Most notably, we find no evidence that foreign banks tend to lend less to SMEs than other banks. In fact, if we focus only on developing countries (see Appendix Table 8), we find that foreign banks are more likely to approve loans to small firms than domestic private banks and do so at fees and rates that are not significantly different than those charged by domestic private banks. These results are in line with studies that discuss a new paradigm in SME lending, where different bank types are able to serve SMEs using different lending technologies (see Berger and Udell 2006; and de la Torre et al. 2010). Relative to government-owned banks, domestic private banks seem to charge higher interest rates for lending to both small and medium-sized enterprises and foreign banks seem to charge higher fees to small enterprises.

Controlling for bank ownership types, Table 5 reveals statistically and economically significant differences in the type and pricing of SME finance across banks operating in developing versus developed countries. In particular, we find that the share of SME lending devoted to investments (i.e., long-run lending) is statistically and economically significantly lower (32 and 25 percentage points lower for small and medium-sized enterprises, respectively) among banks in developing countries. At the same time, banks in developing countries charge 0.8 (0.7) percentage point higher fees for small (medium-sized) enterprises and three percentage points higher interest rates for small enterprises than those in developed countries. On the other hand, there are no statistically significant differences in the share of loans to SMEs or in the percentage of SME applications approved.

Tables 6 and 7 examine whether different features of the legal, and institutional environment across countries can explain the differences in the type and pricing of SME

lending across developing and developed countries that we report in Table 5. In particular, in Tables 6 and 7 we repeat the estimations where the dummy for developing countries was significant in Table 5, while adding variables that capture: the *cost of enforcing contracts* (expressed as a percentage of the value of the claims), the *cost of registering property* (expressed as a percentage of the value of the property) that can be used as loan collateral, the *availability of credit history information* (expressed as an index between 0 and 6, with higher numbers meaning that credit history information is richer and more widely available in a country), and the degree of *protection of property rights*. The first three variables come from the World Bank Doing Business Indicators Database.[8] The measure of property rights is part of the Index of Economic Freedom reported by the Heritage Foundation. Property rights protection is an index between 0 and 100, with higher numbers indicating greater protection of property rights.

The results in Tables 6 and 7 show that the lower share of SME loans for investment observed for developing countries seems to be explained by a higher cost of registering property in these countries, since once we control for this variable, the developing country dummy is no longer significant both in the regressions pertaining to small and medium-sized firm financing. At the same time, the higher fees observed in developing countries for small and medium-sized firm financing seem related to the higher cost of property registration and worse credit information environment in developing countries. Also, the fact that developing countries rank below developed countries in property right protection seems to matter in explaining differences in fees when it comes to financing medium-sized firms. Finally, the higher interest rates observed in developing countries for small firm financing seem to be associated with the higher costs of enforcing contracts and worse protection of property rights prevalent in developing countries.

6 Conclusions

This paper used data from a survey of large banks around the world to study how SME financing by large banks differs across countries and bank ownership types and to investigate the link between lending technologies/organizational structures and SME finance. In particular, this is the first study to empirically test the new paradigm in SME lending first proposed by Berger and Udell (2006), which suggests that SME lending is not dependent on relationship lending.

Our data yield a number of interesting findings. First, different banks apply different lending technologies and organizational structures. In particular, foreign banks are more likely to use arms-length lending technologies and centralized organizational structures. Second, we do not find a strong link between lending technologies and organizational structures, on the one hand, and the extent, type, and pricing of lending to SMEs on the other hand. Third, even though we find differences in the lending technologies and organizational structures used across bank ownership types, we find few significant differences across bank types in the extent, type and pricing of SME finance. Overall, we find that the link between lending technologies, organizational structures, and SME lending is not consistent with the notion that SME finance is based on relationship lending, a type of financing rooted in the use of soft information and decentralized organizational structures. Finally, we find differences in the extent, type and pricing of SME loans across countries, which appear to be driven by differences in the institutional and legal environment. Going forward, it would be interesting to expand the

[8] See http://www.doingbusiness.org.

Table 5 The extent, type, and pricing of SME finance across countries and bank ownership types. Table shows regressions of variables capturing the extent, type, and pricing of SME finance on a dummy for developing countries, a dummy for foreign banks, and a dummy for domestic private banks. Government-owned banks are the omitted category. The share of lending to SMEs is expressed as a ratio of total lending. The percentage of SME loan applications approved is the number of applications approved out of total number of SME loan applications received. The share of SME loans devoted to investment is the ratio of SME loans devoted to investment relative to the total value of SME loans granted. The fees charged on SME loans are expressed as a percentage of the loan amount. Table reports a tobit regression model for the share of SME loans devoted to investment and ordinary least squares estimations for all other dependent variables. Robust t-statistics are in brackets

	Share of SME lending (%)	SME Loan approval (%)	Share of SME loans for investment (%)	Fee (% of SME loan amount)	Real interest rate on lowest risk customers (%)	Real interest rate on highest risk customers (%)
Panel A: Small firm financing						
Developing	2.662	9.938	−31.600	0.779	2.102	3.029
	[1.49]	[0.48]	[−3.07]^{c}	[4.41]^{c}	[1.87]^{a}	[2.31]^{b}
Foreign bank	−1.686	−2.728	−11.660	0.421	1.719	2.468
	[0.44]	[0.41]	[−1.16]	[2.03]^{b}	[1.43]	[1.70]^{a}
Domestic private bank	−3.483	−9.137	−15.83	0.619	3.064	5.867
	[0.96]	[1.09]	[−1.54]	[1.83]^{a}	[2.07]^{b}	[3.03]^{c}
Constant	6.853	72.566	83.87	−0.007	0.542	2.671
	[2.21]^{b}	[3.36]^{c}	[7.08]^{c}	[0.03]	[0.42]	[1.77]^{a}
Observations	48	39	56	69	65	66
R-squared / pseudo R-squared	0.04	0.05	0.02	0.09	0.06	0.12
F-stat test: foreign = private	0.52	0.65	0.32	0.35	0.73	2.84
P-value	0.47	0.43	0.57	0.55	0.4	0.1

Panel B: Medium-sized firm financing						
Developing	−1.114	−2.627	−24.800	0.697	1.447	1.849
	[0.36]	[0.22]	[−2.72][c]	[3.45][c]	[1.37]	[1.40]
Foreign bank	4.066	−13.532	2.999	0.133	0.426	0.663
	[1.74][a]	[1.92][a]	[0.42]	[0.55]	[0.33]	[0.48]
Domestic private bank	2.073	−12.095	0.875	0.318	1.376	4.307
	[0.66]	[1.83][a]	[0.11]	[0.94]	[0.89]	[2.19][b]
Constant	7.890	92.515	67.110	0.173	1.456	3.842
	[2.15][b]	[7.58][c]	[7.08][c]	[0.68]	[1.10]	[2.58][b]
Observations	46	38	54	67	62	63
R-squared / pseudo R-squared	0.05	0.03	0.02	0.07	0.02	0.09
F-stat test: foreign = private	0.44	0.03	0.10	0.38	0.42	3.44
P-value	0.51	0.86	0.75	0.54	0.52	0.07

[a,b,c] denotes significance at 10%, 5%, and 1% significance levels, respectively

Table 6 The impact of the legal and institutional environment on small firm finance. Table explores the role of variables depicting the legal and institutional environment on the type and pricing of small firm finance, while controlling for the bank ownership type and for whether the country is developed or developing. Developing is equal 1 for developing countries and 0 otherwise. Foreign bank is 1 if the bank is foreign-owned and 0 otherwise. Domestic private equals 1 if the banks is domestically-owned and 0 otherwise. Government-owned banks are the omitted category. The share of SME loans devoted to investment is the ratio of SME loans devoted to investment relative to the total value of SME loans granted. The fees charged on SME loans are expressed as a percentage of the loan amount. The cost of enforcing contracts is expressed as a percentage of the value of the claims. The cost of registering property is expressed as a percentage of the value of the property that can be used as loan collateral. The availability of credit history information is as an index between 0 and 6, with higher numbers meaning that credit history information is richer and more widely available in a country. Property rights protection is an index between 0 and 100, with higher numbers indicating greater protection of property rights. Table reports a tobit regression model for the share SME loans devoted to investment and ordinary least squares estimations for all other dependent variables. Robust t statistics are in brackets

	Share of SME loans for investment (%)				Fee				Real interest rate on high risk customers (%)			
Developing	−23.154	−19.714	−26.084	−30.225	0.474	−0.037	0.390	0.788	4.107	−0.92	2.777	2.313
	[−1.19]	[−1.10]	[−1.32]	[−1.51]	[1.90]^{a}	[−0.08]	[1.14]	[2.57]^{b}	[2.47]^{b}	[−0.45]	[1.73]^{a}	[1.33]
Foreign bank	−15.748	−10.222	−12.648	−13.688	0.489	0.353	0.451	0.455	2.188	1.654	2.875	2.881
	[−1.62]	[−1.00]	[−1.23]	[−1.26]	[2.38]^{b}	[1.52]	[2.10]^{b}	[2.04]^{b}	[1.41]	[1.20]	[1.95]^{a}	[1.97]^{a}
Domestic private bank	−14.804	−12.799	−16.353	−17.094	0.461	0.526	0.619	0.645	5.835	5.078	6.37	5.955
	[−1.43]	[−1.22]	[−1.56]	[−1.54]	[1.45]	[1.69]^{a}	[1.84]^{a}	[1.77]^{a}	[2.81]^{c}	[2.82]^{c}	[3.02]^{c}	[2.96]^{c}
Cost of property registration	−1.865				0.099				−0.258			
	[−2.31]^{b}				[4.27]^{c}				[−1.21]			
Property rights		0.261				−0.016				−0.100		
		[0.81]				[−1.67]				[−2.21]^{b}		
Credit information index			2.394				−0.176				−0.659	
			[1.19]				[−2.58]^{b}				[−1.44]	
Cost of contract enforcement				−0.034				0.000				0.057
				[−0.31]				[0.04]				[2.03]^{b}
Constant	87.803	60.111	71.848	85.114	−0.226	1.497	0.915	−0.044	2.956	11.378	4.81	1.003
	[4.16]^{c}	[1.82]^{a}	[2.89]^{c}	[3.80]^{c}	[−0.78]	[1.66]	[1.86]^{a}	[−0.13]	[1.54]	[2.90]^{c}	[1.85]^{a}	[0.56]
Observations	53	56	53	53	66	69	66	66	64	66	64	64
R-squared / pseudo R-squared	0.03	0.02	0.01	0.01	0.32	0.14	0.17	0.06	0.13	0.17	0.15	0.18
F-stat test: foreign = private	0.01	0.13	0.21	0.19	0.01	0.31	0.26	0.29	3.13	3.00	2.80	2.26
P-value	0.90	0.72	0.65	0.67	0.93	0.58	0.61	0.59	0.08	0.09	0.10	0.14

^{a,b,c} denotes significance at 10%, 5%, and 1% significance levels, respectively

Table 7 The impact of the legal and institutional environment on medium-sized firm finance. Table explores the role of variables depicting the legal and institutional environment on the type and pricing of medium-sized firm finance, while controlling for the bank ownership type. Developing is equal 1 for developing countries and 0 otherwise. Foreign bank is 1 if the bank is foreign-owned and 0 otherwise. Domestic private equals 1 if the banks is domestically-owned and 0 otherwise. Government-owned banks are the omitted category. The share of SME loans devoted to investment is the ratio of SME loans devoted to investment relative to the total value of SME loans granted. The fees charged on SME loans are expressed as a percentage of the loan amount. The cost of enforcing contracts is expressed as a percentage of the value of the claims. The cost of registering property is expressed as a percentage of the value of the property that can be used as loan collateral. The availability of credit history information is as an index between 0 and 6, with higher numbers meaning that credit history information is richer and more widely available in a country. Property rights protection is an index between 0 and 100, with higher numbers indicating greater protection of property rights. Table reports a tobit regression model for the share SME loans devoted to investment and ordinary least squares estimations for all other dependent variables. Robust t statistics are in brackets

	Share of SME loans for investment (%)				Fee				Real interest rate on high risk customers (%)			
Developing	−20.557	−1.895	−17.105	−23.542	0.370	−0.144	0.375	0.692	2.671	−1.552	1.142	0.647
	[−1.26]	[−0.12]	[−1.06]	[−1.43]	[1.49]	[−0.40]	[1.29]	[2.10]^{b}	[1.53]	[−0.75]	[0.67]	[0.36]
Foreign bank	0.575	5.232	1.768	2.333	0.214	0.053	0.114	0.149	0.173	−0.158	0.883	0.896
	[0.08]	[0.71]	[0.23]	[0.29]	[0.86]	[0.20]	[0.44]	[0.57]	[0.10]	[−0.12]	[0.62]	[0.63]
Domestic private bank	2.755	5.667	0.569	0.909	0.196	0.205	0.314	0.332	4.163	3.555	4.911	4.115
	[0.35]	[0.73]	[0.07]	[0.11]	[0.61]	[0.65]	[0.98]	[0.88]	[1.99]^{a}	[1.95]^{a}	[2.30]^{b}	[2.01]^{b}
Cost of property registration	−1.408				0.0916				−0.244			
	[−2.07]^{b}				[3.20]^{c}				[−1.08]			
Property rights		0.484				−0.0176				−0.0834		
		[1.78]^{a}				[−2.04]^{b}				[−1.96]^{a}		
Credit information index			3.307				−0.164				−0.912	
			[1.98]^{a}				[−2.55]^{b}				[−2.10]^{b}	
Cost of contract enforcement				0.023				0.001				0.065
				[0.46]				[0.47]				[2.26]^{b}
Constant	71.422	23.614	50.297	65.292	0.00309	1.752	0.995	0.137	4.403	11.2	7.369	2.463
	[3.94]^{c}	[0.88]	[2.67]^{b}	[3.65]^{c}	[0.01]	[2.31]^{b}	[2.335]^{b}	[0.358]	[2.11]^{b}	[2.94]^{c}	[2.77]^{c}	[1.28]
Observations	51	54	51	51	64	67	64	64	61	63	61	61
R-squared / pseudo R-squared	0.02	0.03	0.02	0.01	0.31	0.14	0.16	0.04	0.11	0.13	0.17	0.20
F-stat test: foreign = private	0.10	0.00	0.03	0.04	0.00	0.31	0.45	0.32	3.71	3.65	3.98	2.71
P-value	0.75	0.95	0.86	0.84	0.94	0.58	0.51	0.58	0.06	0.06	0.05	0.11

[a,b,c] denotes significance at 10%, 5%, and 1% significance levels, respectively

number of banks and countries surveyed in order to see if we can corroborate our findings in a larger sample, especially one that includes small as well as large banks.

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Appendix

Table 8 The extent, type, and pricing of SME finance across bank ownership types in developing countries. Table shows regressions of variables capturing the extent, type and pricing of SME finance on a dummy for foreign banks and a dummy for domestic private banks. Government-owned banks are the omitted category. The share of lending to SMEs is expressed as a ratio of total lending. The percentage of SME loan applications approved is the number of applications approved out of the total number of SME loan applications received. The share of SME loans devoted to investment is the ratio of SME loans devoted to investment relative to the total value of SME loans granted. The fees charged on SME loans are expressed as a percentage of the loan amount. Table reports a tobit regression model for the share SME loans devoted to investment and ordinary least squares estimations for all other dependent variables. Robust t statistics are in brackets

	Share of SME lending (%)	SME loan approval (%)	Share of SME loans for investment (%)	Fee (% of SME loan amount)	Real interest rate on lowest risk customers (%)	Real interest rate on highest risk customers (%)
Panel A: Small firm financing						
Foreign bank	−1.388	1.562	−13.568	0.456	2.020	2.903
	[0.34]	[0.25]	[−1.23]	[2.04]^{b}	[1.58]	[1.87]^{a}
Domestic private bank	−3.320	−13.427	−17.062	0.643	3.486	6.046
	[0.80]	[1.64]	[−1.53]	[1.75]^{a}	[2.11]^{b}	[2.78]^{c}
Constant	9.32	82.504	53.592	0.747	2.356	5.431
	[2.56]^{b}	[15.42]^{c}	[5.56]^{c}	[4.66]^{c}	[3.12]^{c}	[5.70]^{c}
Observations	42	35	50	63	57	58
R-squared / pseudo R-squared	0.02	0.15	0.01	0.05	0.05	0.10
F-stat test: foreign = private	0.49	4.71	0.20	0.26	0.67	1.86
P-value	0.49	0.04	0.66	0.61	0.42	0.18
Panel B: Medium-sized firm financing						
Foreign bank	5.175	−14.072	2.236	0.150	0.735	0.909
	[2.29]^{b}	[1.96]^{a}	[0.28]	[0.57]	[0.53]	[0.61]
Domestic private bank	4.689	−11.556	0.855	0.324	1.667	4.441
	[1.43]	[1.72]^{a}	[0.10]	[0.85]	[0.96]	[1.99]^{a}
Constant	5.625	89.888	42.7	0.860	2.657	5.528
	[3.78]^{c}	[25.60]^{c}	[6.51]^{c}	[3.85]^{c}	[2.60]^{b}	[5.39]^{c}
Observations	40	34	47	59	54	55
R-squared / pseudo R-squared	0.07	0.04	0.00	0.01	0.01	0.08
F-stat test: foreign = private	0.02	0.09	0.04	0.26	0.3	2.43
P-value	0.89	0.77	0.85	0.61	0.58	0.13

[a,b,c] denotes significance at 10%, 5%, and 1% significance levels, respectively

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